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THE MEASUREMENT OF INDUSTRIAL EMPLOYMENT BY THE BUREAU OF LABOR STATISTICS.

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THE MEASUREMENT OF INDUSTRIAL EMPLOYMENT BY THE BUREAU OF LABOR STATISTICS 1/

The Bureau of Labor Statistics has collected and published, for many years, monthly statistics relating to industrial employment, wages, and hours of work as an integral part of its current employment statistics program. These series provide a detailed and comprehensive body of information on industrial activity for the county as a whole and, on a more limited basis, for States and important localities. To aid in the understanding and use of the data, the following information with respect to the BLS employment series has been provided. Part I deals with the nature of the employment information and the basic methods of estimating employment. Part II discusses the revised employment data released by the Bureau of Labor Statistics in September 1949.

1/ Prepared by Sydney S. Netreba of the Bureau's Division of Employment Statistics.

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THE MEASUREMENT OF INDUSTRIAL EMPLOYMENT BY THE BUREAU OF LABOR STATISTICS

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November 1949

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PART I

Sources and Scope of Current Employment Data

For the country as a whole, continuous series are published each month on the number of wage and salary workers employed in all nonagricultural establishments and in the 8 major industry divisions: manufacturing, mining, contract construction, transportation and public utilities, trade, finance, service, and government. Both all-employee and production-worker employment series are also presented for 21 major manufacturing groups and 104 separate manufacturing industries. Within nonmanufacturing, total employment information is published for 23 major groups and 13 component industries. Production-worker employment is also shown for the mining division as a whole and for the industry components.

Series covering employment in manufacturing industries are also currently published for all States; employment in all nonagricultural establishments and in each of the major industry divisions is available for about 30 States. Expansion of the program, now under way, is designed to produce similar series for all States and for about 100 major metropolitan areas.

For private nonagricultural industries the BLS employment information covers all full- and part-time employees who were on the pay roll, i.e. who worked during, or received pay for, the pay period ending nearest the 15th of the month. For Federal establishments the employment period relates to the pay period ending prior to the first of the month; for State and local governments, during the pay period on or just before the last of the month. Proprietors, self-employed persons, domestic servants, and unpaid family workers are excluded.

Approximately 120,000 cooperating establishments furnish monthly employment and pay-roll schedules, by mail, to the Bureau of Labor Statistics. The number of establishments reporting employment data and the number of employees covered, for each industry division, are as follows:

APPROXIMATE COVERAGE OF BLS EMPLOYMENT AND PAY ROLL SAMPLE

Industry Division	Number of establishments	Employees	
		Number	Percent of total
Mining	2,700	460,000	47
Contract construction	15,000	450,000	23
Manufacturing	35,200	8,845,000	62
Transportation and public utilities:			
Interstate railroads (ICC)	-	1,359,000	98
Rest of division (BLS)	10,500	1,056,000	41
Trade	46,300	1,379,000	15
Finance	6,000	281,000	16
Service:			
Hotels	1,200	115,000	25
Laundries and cleaning and dyeing plants	1,700	86,000	17
Government:			
Federal (Civil Service Commission)	-	1,885,000	100
State and local (Bureau of Census - quarterly)	-	2,400,000	62

With respect to employment, these plants furnish the following data:

(1) For manufacturing, mining, laundries, cleaning and dyeing:
   (a) all employees or the total number of wage and salary workers, i.e. all full- and part-time employees in the respective establishments who worked during or received pay for any part of the period reported; salaried officers of corporations are included, proprietors or firm members are excluded.
   (b) the number of all full- and part-time production and related workers on the pay roll who worked during or received pay for any part of the pay period reported; persons on paid sick leave, paid holidays, and paid vacations are, therefore, also included.

(2) For other nonmanufacturing industries, i.e. wholesale and retail trade, public utilities, finance, hotels, and miscelleneous:
   (a) the total number of full- and part-time wage and salary workers as indicated above.
   (b) the number of full- and part-time nonsupervisory employees and working supervisors; similarly persons on paid sick leave, paid holidays, and paid vacations are included.

Cooperating State Agencies

The BLS current employment statistics program is an integrated Federal-State project which provides industrial employment information on a national, State, and area basis. In accordance with authority granted in a Congressional Act of 1930 (Public Laws, Chapter 873, Vol. 46, Part I) and in order to minimize the reporting requirements for cooperating establishments, the Bureau of Labor Statistics has entered into agreements with various State agencies. Basic uniformity in the collection of BLS-State employment statistics is obtained by the use of BLS-designed schedules for monthly reporting. The "contract" State agencies edit these reports according to standards defined in editing instructions issued by the BLS, and make these data available for inclusion in the national estimates. The cooperating agencies are responsible for the preparation of State and area employment statistics. To maintain comparable data from State to State, statistical standards are set forth in a BLS-State procedures manual and in related instructional memoranda. A list of the cooperating State agencies, now covering all States and the District of Columbia, is presented in the monthly mimeographed Employment and Pay Rolls Detailed Report.

BLS Methods of Estimating Current Employment

Industrial Classification - In the BLS employment, hours, and earnings series, reporting establishments are classified into significant economic groups on the basis of major postwar product or activity as determined from annual sales data. The following references define the industry classification structure currently used in the employment statistics program:

(1) For manufacturing industries - Standard Industrial Classification Manual, Vol. I, Manufacturing Industries, Bureau of the Budget, November 1945;
(2) For nonmanufacturing industries - Industrial Classification Code, Federal Security Agency, Social Security Board, 1942.

Estimation Procedures - The current employment data published by the BLS are based upon reports from a sample group of establishments, since in many industries full coverage would be prohibitively costly and time-consuming. This approach necessitates the following four steps:

(1) A total employment figure (benchmark) for an industry, as of a specified period, is obtained from sources which, singly or in combination, are known to provide either a complete count of employment for the industry or an estimate of reasonable accuracy.

(2) Employment data for a sample group of reporting establishments are compiled for the benchmark month and subsequent months.

(3) The ratio of employment in one month to that in the preceding month, for identical establishments in each industry, is computed for each consecutive pair of months. These ratios are termed link-relatives.

(4) The link-relative for the month following the bench-mark month is applied to the bench mark for the industry to derive the level of employment in that month. This, in turn, becomes the base for obtaining the next month's level. The same procedure is followed in succeeding months until new bench-mark data become available. At that time, an adjustment is made, if necessary, to eliminate possible differences between series based on the old and new bench marks.

An illustration of the estimation procedure used in those industries for which both all-employee and production-worker employment information is published follows: The latest production-worker employment bench mark for a given industry was 50,000 in September. According to the BLS reporting sample, 60 establishments in that industry employed 25,000 workers in September and 26,000 in October, an increase of 4 percent. The October figure of 52,000 would be derived by applying the change for identical establishments reported in the September-October sample to the benchmark:

$$50{,}000 \times \frac{26{,}000}{25{,}000} \text{ (or } 1.04) = 52{,}000$$

The estimated all-employee level of 65,000 for October is then determined by using that month's sample ratio of production workers to total employment.

$$\left(\frac{52{,}000}{.800} \text{ (or multiplied by } 1.25) = 65{,}000\right).$$

Similarly, the employment level for the next month would be prepared by the use of reports for October-November and the previously determined October employment. Thus, the industry employment trends reflect the fluctuations shown by establishments reporting to the Bureau of Labor Statistics, while the level of employment is determined by the bench mark.

The foregoing described the general methodological procedure; special treatment is necessary, however, for so-called "atypical" changes. Strikes or other shut-downs in an important plant or group of plants represent major examples of "atypicality". The special procedure is applied only where the reporting sample does not cover the major portion of total employment in the industry. Of basic importance also, is the fact that the special change was restricted to the major plant in question and was not reflected in over-the-month developments reported by the other plants in the industry sample.

Employment in the atypical firm is deducted from the previous level of employment for the industry as a whole as well as from the industry sample for the two-month comparison. The usual link relative procedure, outlined previously, is then applied, followed by the addition of the "atypical" firm's employment in the current month.

Sources of Bench-Mark Data - Complete counts or benchmarks are required periodically to adjust for errors resulting from the use of a month-to-month sample, and further, to provide base levels of employment for subsequent projections during the inter-bench-mark periods. For example, a possible error is a "downward bias", resulting from the difficulty of introducing new firms into the sample at the time they begin operations.

Since 1939 the primary source for bench-mark materials has been the employment covered under the Social Security Program:

(1) employment in firms liable to contributions to the State unemployment compensation funds;
(2) data from the Bureau of Old Age and Survivors Insurance on employment in firms exempt from State unemployment insurance laws because of their small size.

Information from these two sources covers a substantial number of the persons engaged in nonfarm employment in each State. Special bench-marks are used for industries not covered by the social security program. Services for local, State, and Federal governments, and services performed for religious, educational, and charitable organizations are among the more important exclusions from the social security program. Bench marks for State and local government are based on data compiled by the Bureau of the Census, while most of the data on Federal Government employment is made available by the U. S. Civil Service Commission. The Interstate Commerce Commission is the source for railroads.

Production-worker employment information is not available from the social security reports; in general, only all-employee data (wage and salary employment) are obtained from the previously mentioned bench-mark sources. Therefore, a production-worker bench mark must be derived for each industry for which such employment information is made available. This is done by applying to the all-employee bench mark the ratio of production-worker employment to total employment in the comparable period, as determined from the BLS industry sample.

Revisions - Owing to the sampling and estimating procedures used, varying degrees of error are likely to develop in the current monthly employment levels. Correction of these errors by subsequent revision of previously published data is, therefore, necessary. In this respect, two types of revisions periodically incorporated into the BLS employment series should be distinguished:

(1) revisions of current monthly data arising from the preliminary release of the information;
(2) annual revisions on a more extensive basis which result from the availability of more current bench mark reports.

1. The Bureau of Labor Statistics makes available, about one month after the month of reference, preliminary information relating to wage and salary employment in nonfarm establishments, including major industry divisions and a number of manufacturing and nonmenufacturing industry groups. Such information is based upon preliminary tabulations of data from those sample establishments that have been received in time for the preliminary release. Subsequently, revised data are made available on the basis of all reports in the sample. Thus, data presented in detailed industry reports for the current and the immediately preceding month are subject to further revision. These revisions represent the first type mentioned above.

2. Appropriate revisions, based on new bench marks, are now introduced into the employment series annually or less frequently, as required. These adjustments are necessary primarily because reports are not immediately available from new firms; frequently such reports are not included in the particular industry sample until after the establishments have been in operation for some time. BLS experience with the employment statistics program has shown that, without bench-mark adjustments, the employment data tend to develop a marked understatement which becomes larger from year to year. For manufacturing and many nonmanufacturing industries, the data used in preparing the new bench marks are available about 7 to 10 months after the last month of the bench-mark period. In general, the bench-mark period relates to the first quarter of the year. The BLS monthly employment levels, which had been made available previously for that quarter, are compared with the new bench-mark data. The need for adjustment of the published employment information is determined from this comparison.

Comparability With Other Employment Data:

1. The 1947 Census of Manufactures

Comparison of the 1947 Census of Manufactures employment information with the revised level of factory employment for 1947 made available by the Bureau of Labor Statistics indicates significant differences between the two sets of data. Thus the BLS level is about 1 million higher than the Census average for all-employees in U. S. manufacturing industries. 1/

Precise data with which to evaluate the Census-BLS differences are not available at present. It is expected that a number of inter-agency studies now underway will eventually set forth, more exactly, the specific reasons for the differences. The information now available indicates that the following factors are primarily responsible for the BLS-Census discrepancy:

(a) Differences in classification of establishments on the part of Census and BLS. Separate classification of manufacturing establishments by the various agencies, i.e. Census, on the one hand, and the bench-mark agencies (BES-BOASI)

1/ Census-BLS comparison should not be made on the basis of the old BLS series since the information published prior to September 1949: (1) is not based upon the 1945 SIC structure; (2) does not reflect the reclassification of establishments for postwar product or activity; and (3) does not include the 1947 bench-mark adjustment.

and BLS, on the other, inevitably results in differences with respect to industry coding. This factor is probably of major importance though it cannot be measured with any precision. Machinery was set up for agreement in such coding by BES-CASI and BLS. The Census classification of establishments, however, was accomplished independently on the basis of different information. Also, the classification of a number of establishments in the new BLS series reflects more recent product or activity information than does the Census, which relates to business activity during 1947.

(b) The Census Bureau did not include employment for 35,000 small sawmills or for independent logging camps. Consequently, the largest discrepancy among the major manufacturing groups appears in the lumber group. The variation in industry definition, which resulted from the Census exclusions for this group, produced a level which is 200,000 below the BLS new series. Census definition and coverage of manufacturing, therefore, differ from the BLS series. Other industries of lesser importance not covered by the Census because of budgetary reasons or because of difficulty of collecting adequate industry or product statistics include: establishments making wiping cloths; those that both quarry and cut stone; those engaged primarily in rebuilding motor vehicles, and establishments engaged in boat repairs employing less than 10 employees. It is also possible that the Census may not have been able to obtain reports from firms that were engaged in business during 1947 but discontinued operations thereafter.

(c) Census operations and requirements are such that very detailed information relating to individual establishments is collected. It is possible, therefore, for differences to arise as a result of obtaining separate activity and department reports for a given establishment. In the BLS operations, the major activity for the establishment as a whole is the determining factor. The Census has stated that it is probable "that the Census reports permit the more successful exclusion of nonmanufacturing activities (such as distribution, transportation, and mining) at locations apart from the manufacturing plant than was possible in the statistics published by other agencies. The Census was probably more successful also in avoiding the combination of manufacturing plants at different locations or in different industries". 1/

Also among the exclusions from the manufacturing definition under the SIC code are the following operations: retail establishments producing some or all of the products sold on the premises; repair trades, hand trades, and custom industries such as power laundries, automobile, electrical, jewelry, and clothing repair shops. According to the Census Bureau, the employment figures were moderately reduced since the detailed information collected by the 1947 Census of Manufactures made it possible to adhere more closely to the SIC definitions with respect to such activities.

(d) In addition to the differences noted above, the Census of Manufactures excluded employment in auxiliary units and in the administrative offices of firms where such offices were physically separated from producing establishments operated by the firm. While definite information as to the magnitude of such employment is not yet available, preliminary estimates indicate that it is significant, amounting to more than 300,000 nationally. The Standard Industrial Classification Manual

1/ U. S. Bureau of the Census, Preliminary Industry Report, May 13, 1949, (MC 100 - 1).

states that auxiliary units (power plants, laboratories, repair shops, garages, etc.) operated by a manufacturing establishment for its own use are classified according to the primary activity of that establishment. Similarly, central and district administrative offices are included with the manufacturing establishment when they are not primarily wholesale outlets.

It should also be noted that the Bureau of Labor Statistics does not rely upon the Census of Manufactures reports for bench-mark data in the preparation of manufacturing employment series. Social insurance agency tabulations have been selected because:

(1) being based upon employer tax returns they constitute as complete a count of wage and salary workers as it is believed possible to obtain; and

(2) they are available on a regularly recurring basis, thus providing continuing bench-marks to which the level of the BLS series can be adjusted.

However, the inherent nature of the social security reports probably imposes a number of limitations on their use for current employment statistics. Since the collected employment information is, in general, the by-product of a tax reporting system, the industrial classification for firms engaged in a number of different industrial activities is sometimes not as precise as it might be from reports collected solely for employment statistics purposes. For the same reason, a number of State unemployment insurance agencies do not classify establishments in individual (4-digit) industries. National bench-marks are, therefore, not available for such industries.

2. The Monthly Report of the Labor Force

The BLS total of all-employees in nonagricultural establishments should not be compared with Census Bureau's MRLF estimates of the number of persons employed in nonagricultural industries since the BLS series excludes the following: unpaid family workers, domestics, and proprietors and self-employed persons. The only conceptually valid comparison is with the MRLF total of wage or salary workers employed in nonagricultural industries, after exclusion of those engaged in domestic service. Despite similarity of definition, there are generally differences in monthly levels and in the magnitude and direction of monthly changes between the BLS nonfarm employment series and the comparable MRLF total. These differences stem, primarily, from the differences in methodological approach in the two series.

The MRLF data are based upon personal interviews each month with a scientifically selected sample of households. In accordance with such responses, the population 14 years of age and over is classified into those in and those not in the labor force. Those in the labor force are further classified into the employed and unemployed. Further classification is made with respect to agricultural and nonagricultural activities, class of worker, etc. The BLS approach involves industry by industry samples of establishments and unified reports covering employment, pay rolls, and man-hours. The BLS non-farm employment total is then built up from specific industries. The basic difference in the source of response probably accounts for most of the variations in the final data. Illustrating one example of the resultant differences is the fact that in the BLS series, persons who worked in more than one establishment during the reporting period would be counted more than once.

Limitations of the Data

Essentially, the approach followed by the Bureau of Labor Statistics results in a measure of employment which represents a count of persons on the pay rolls of nonfarm establishments during one pay period. For most establishment reports, the pay-roll period covers 1 week in each month, generally the week ending nearest the 15th of the month. Such a pay-roll count includes persons who worked during, or received pay for, any part of the reporting period. The employment series, therefore, reflect turn-over of personnel: the same person may appear on two separate establishment pay rolls in the same period. Thus, the BLS employment information is not a measure of the number of full-time jobs that were available, nor is it an unduplicated count of paid workers. Owing to the restrictions with respect to the reporting period, the data do not refer to employment throughout the month, nor to employment at one point of time in the month.

Since the guiding principle of the BLS employment concept is that of work during, or receipt of payment for, a given period, distinctions must be made with respect to persons who may have jobs but who are not at work for various reasons. Thus, persons on paid vacations or paid sick leave are included in the employment count, while those on leave without pay during the reporting period are not considered as employed. Work stoppages in effect throughout the reporting period, result in the exclusion from employment of those so engaged; the employment level will not be affected if persons involved in work stoppages worked or received pay in any part of the pay period. Similarly, persons who are laid off temporarily or who leave temporarily are excluded from employment if such personnel actions cover the entire reporting period and payment is not involved.

The problems of classification and the limitations of the classification structure also affect the employment data. Thus, in most instances it is not possible to provide detailed employment for specific products. The requirement that establishments be classified according to major product or activity may result in the "concealment" or understatement of employment in other important activities, and in a simultaneous overstatement of employment in the major activity.

PART II

The New Employment Series

In September 1949, the Bureau of Labor Statistics released new series on employment by industry. The revised employment data incorporated three major changes which significantly affected the previously published levels of industrial employment, as well as the industries for which the information was available:

1. Adoption of the 1945 Standard Industrial Classification structure for the manufacturing industries; this new classification redefines a number of industries and provides new industrial groupings. The previous series for manufacturing industries were based for the most part on the 1939 Census of Manufactures classification structure.

2. Reclassification of reporting establishments to reflect major postwar product or activity; in the previous series classification was on the basis of major product or activity in 1939.

3. Adjustment to 1947 bench-mark levels and a revision in the method of estimating production-worker employment. The ratio of production-workers to all employees as determined from BLS current industry samples has replaced projections of the 1939 Census ratios.

While these changes have resulted in a lack of historical continuity for many industries, the new series contains a number of improved features. The use of the Standard Industrial Classification system, now being adopted by most of the Federal statistical agencies, results in greater comparability with related series, thereby facilitating economic analysis. All segments of manufacturing employment are covered in the published industry series, leaving no unpublished segments. In addition, both all-employee and production-worker data are provided for all published manufacturing and mining series, including those for which only production-worker employment was available on the old basis. New series have been presented for a number of nonmanufacturing industries for which employment data were not previously available. These include industries in the transportation, trade, finance, and service divisions.

The following are among the more important changes which have resulted from the shift to the new SIC code. The metal industries have been rearranged to show one major group for primary metals and another for fabricated metal products. This rearrangement supplants, in the large part, the former iron and steel and nonferrous metals groups. Motor vehicles and motor-vehicle equipment, formerly a separate major group, are now included in the transportation equipment group. The structure of the textile group has been revised to combine all broad-woven fabric mills (including cotton, silk, wool, and synthetic fiber) into one category; a similar revision has been instituted for yarn and thread mills. A number of wood-product classifications have been transferred from the old furniture to the new lumber group; two new groups have been established: lumber and wood products (except furniture), and furniture and fixtures. The tobacco manufactures group now also includes establishments primarily engaged in the stemming and redrying of tobacco. Another major group, newly devised by the SIC code and affecting the previous miscellaneous and nonferrous metals groups, includes professional, scientific, and controlling instruments; photographic and optical goods; and watches and clocks. Industry components of the chemicals group were also extensively rearranged.

A number of changes involving shifts out of manufacturing and into nonmanufacturing classifications also resulted from adoption of the SIC structure:

(1) Jobbing establishments which do no manufacturing, but which merely assign materials to contract factories for fabrication and then sell the finished product, are included in trade. The principal manufacturing industries affected were in the textile and in apparel groups, although meatpacking and leather tanning and finishing were also affected;
(2) Retail stores producing some or all of the bread and other bakery products sold on the premises are included in retail trade;
(3) Machine shops exclusively engaged in repair work are included in service;
(4) Establishments which manufacture dairy products, but which are also engaged in the distribution of fluid milk or cream are classified in trade, even if manufacture is the major activity;
(5) Establishments primarily engaged in pre-mixing and delivering ready-mixed concrete are also classified in trade;
(6) On the other hand, establishments (other than wholesalers) primarily engaged in spice grinding, sorting, and packaging and coffee roasting are now included in manufacturing.

In contract to the manufacturing industries, the adoption of the Social Security Board classification structure for nonmanufacturing industries (1942) has resulted in only one substantial change with respect to the industrial grouping or arrangement of the BLS nonmanufacturing data. This is the transfer of automobile repair services from the trade to the service division. Greater industry detail, however, has been added to the list of nonmanufacturing industries for which employment data are available.

Comparability of New Employment Series with Previously Published Data:

Revised employment, hours, and earnings information has been made available in mimeographed publications beginning with September 1949 and in issues of the Monthly Labor Review beginning with October 1949. Based on 1947 bench-mark data, the new series, for the most part, cover the period beginning with January 1947. The basic revisions have resulted in a lack of historical continuity, prior to 1947, for many industries and in a substantial change in the list and definitions of the industries for which statistics are prepared. Continuity has been maintained, however, for total nonagricultural employment, the major industry divisions, and all manufacturing production-worker employment, hours, and earnings. Revisions in the total nonagricultural and major division series begin with October 1946; the manufacturing production-worker series, however, have been revised back to the beginning of 1941.

Most of the discontinuities between the "old" and the "new" series have occurred in the manufacturing sector. This reflects, in large part, the transition to the new SIC code. Thus, only two major manufacturing groups on the new basis - leather and printing - correspond exactly in terms of industry definition with the "old" series. For separate manufacturing industries, 39 classifications were found to coincide with the previous definition of the industry. Other industries represented either new definitions or reflected approximate correspondence with the former classifications.

Despite the number of industry classifications for which definitions are continuous, the previously published employment and hours and earnings information for separate industries covering the period prior to January 1947 can be used in conjunction with the revised data for the subsequent period in only a few instances. In this connection, a factor of considerable importance was the large-scale program of reclassification of reports from individual establishments to reflect postwar product or activity. In the "old" series the Bureau of Labor Statistics had retained the 1939 Census classification of all reporting manufacturing establishments without respect to subsequent change in product or activity. The resulting shifts of establishments from one industry to another would have caused "breaks" even if the SIC changes in industry definition and grouping had not occurred. Thus, it was found in reviewing the former codes for the more than 80,000 BLS reporting establishments, that about 4 out of 10 required further investigation to obtain an appropriate classification. In most instances the subsequent revision in classification reflected changes in economic activity.

Differences in Employment Levels, Old and New Series:

For the 2 years (1947 and 1948) in which the "old" and "new" BLS employment series overlap, the revised annual average nonfarm employment is lower by about 600,000 for 1947 and by 930,000 in 1948, differences measuring about 1.3 and 2 percent, respectively, in these years. These differences largely reflect the downward revisions in manufacturing employment.

The overstatement of employment in the manufacturing industries, which began in the final quarter of 1946, amounted to about 400,000 in January 1947 and continued to increase throughout the following 2 years. Unfortunately, it is not possible to state precisely the reasons for this growing discrepancy. The major part of it was concentrated in the lumber, apparel, and food groups, where the month-to-month changes shown by the BLS sample were apparently not properly representative of the actual changes in these industries. Since the BLS sample is heavily weighted by large firms, it appears that employment in the large establishments increased much more rapidly than in the smaller and less-adequately represented establishments.

The "old" series was last adjusted to 1946 bench-marks. The adjustment to 1947 data was somewhat delayed owing to the work involved in shifting to the new classification codes. The "new" series, however, is based upon 1947 bench-marks, an adjustment which required some downward revision. Thus, prompt revision of the data on the old basis to 1947 bench-marks would have reduced the levels for 1947 and the subsequent period. In addition, the change to the Standard Industrial Classification structure apparently resulted in a net reduction in the number of workers classified in the manufacturing division.

Another factor, probably of considerable importance, was the use of the so-called "bias correction factors". As has been stated previously, the BLS employment series tends to develop a downward bias arising from the difficulty of obtaining proper and immediate representation, in the industry employment samples, of those firms which have newly entered into the business population. (Discontinued operations or "deaths" on the part of firms in the given sample are, of course, reflected in the employment information.) In an attempt to adjust for such bias, a set of "correction factors" was devised. These factors, based on long-term considerations of the relationships between successive bench-mark levels and unadjusted data derived from monthly sample changes, resulted in monthly additions

to the employment level. In general, the factors for most industries related to the average experience for a 10-year period. These empirical factors, it was believed, would minimize the magnitude of the future adjustments to new bench-marks, in addition to insuring that current employment estimates would more nearly reflect "true" levels of employment. These anticipations did not prove to be correct for this period. In most industries, the classification changes were such that the prior relationships are no longer applicable. Also, the previous factors, even where industry counterparts do exist under the new structure, are not necessarily valid for the more recent postwar years. The continued use of the factors in the "old" series for data covering the period after 1946 may well have been responsible for most of the previously mentioned overstatement in levels of manufacturing employment. The decrease during 1947 and 1948 in the rate of growth of many segments of the business population, compared to the immediate postwar period, tends to confirm this view.

To determine the continued need for, and magnitude of adjustment factors, the new BLS employment data were compared with independent bench-mark information subsequent to the original period of adjustment. In most industries, the new series are based on first quarter-1947 bench-marks; the BLS industry employment estimates for a later period, generally the third quarter-1947, were compared with bench-mark data for that period. In a substantial number of industries, only slight differences were noted by this comparison; factors were, therefore, not instituted for these categories. In those industries where the observed disparity appeared to require moderate additional adjustments, ranges of differences were established; the lower limit of the range determined the magnitude of the factor. In contrast to the procedure followed in the "old" series, no empirical bias correction is used at the all-manufacturing level. The factor for over all factory employment added about 30,000 per month in 1947 and 1948. The individual industry adjustments, where applied on the new basis, are, of course reflected in the totals.

The method used in the old series in estimating employment in the "all other", unpublished, industries in the manufacturing industry groups also produced an error of overstatement. In the old series, the change shown by the published industries was attributed to the unpublished ones as well. Subsequent review of this procedure indicated that in many instances the later industries actually moved in the opposite direction. In the new series, there are no unpublished segments in the manufacturing division; consequently, the error from this source has been eliminated.

Revisions in the level of manufacturing production-worker employment resulted both from the various factors enumerated previously and from a change in the methods used. Ratios of production workers to all employees, as computed from BLS current industry samples, have replaced the use of projected 1939 Census of Manufactures ratios. The BLS sample data indicated higher ratios of production-workers to all employees in the manufacturing division for the period beginning with 1941. Revisions of the production-worker series consequently begin with January 1941. More recent comparison of the BLS ratios for 1947 with similar information derived from the 1947 Census of Manufactures confirms the general validity of the sample relationships.

A further difference between the "old" and "new" series is a change arising from the nature of the bench-mark data and the manufacturing industries selected for publication on the new basis. In the previously published data, bench-marks identical with the published industry detail were not always available.

This required varying distribution and allocation methods to devise "synthetic" bench-marks. Errors which developed as a result of these techniques will not be continued in the revised series. In the new data, employment information is published only for those industry classifications for which coincidental bench-marks exist. The extent of the differences produced by this change is not definitely known. It is clear, however, that some difference (and improvement) owing to this change has occurred.

Indexes of Weekly Pay Rolls

Effective with the issuance of the new employment series, all pay-roll indexes (based upon 1939 as 100), have been discontinued, except for all manufacturing industries combined. This was made necessary by the lack of comparable industry information for 1939 to serve as a base for the indexes.

Aggregate weekly pay rolls for all manufacturing industries are derived by multiplying gross average weekly earnings by production-worker employment. The pay roll index is obtained by dividing the total pay roll for a given month by the average weekly pay roll in 1939. Similarly, for individual manufacturing industries aggregate weekly pay rolls, in dollars, may be computed by multiplying production-worker employment by average weekly earnings, where both series are available.

The pay-roll data represent weekly pay rolls of both full- and part-time production and related workers who worked during or received pay for any part of the pay period ending nearest the 15th of the month, before deductions for old-age and unemployment insurance, group insurance, withholding tax, bonds, and union dues; also, includes pay for sick leave, holidays, and vacations taken. They exclude cash payments for vacations not taken, retroactive pay not earned during period reported, value of payments in kind, and bonuses, unless earned and paid regularly each pay period.

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